Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

JUNE 2023

AGRICULTURAL SCIENCES MARKING GUIDELINE

MARKS: 150

This question paper consists of 12 pages.

SECTION A

QUESTION 1

1.1	1.1.1	B ✓✓		
	1.1.2	C ✓✓		
	1.1.3	C ✓✓		
	1.1.4	B ✓✓		
	1.1.5	C ✓✓		
	1.1.6	D ✓✓		
	1.1.7	A ✓✓		
	1.1.8	B ✓✓		
	1.1.9	C ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	None ✓✓		
	1.2.2	B only ✓✓		
	1.2.3	Both A and B ✓✓		
	1.2.4	A only ✓✓		
	1.2.5	A only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Assimilation ✓✓		
	1.3.2	Sustainable medication ✓✓		
	1.3.3	Ovigenesis/Oogenesis ✓✓		
	1.3.4	Superovulation ✓✓		
	1.3.5	Cryptorchidism ✓✓	(5 x 2)	(10)
1.4	1.4.1	Maintenance ration ✓		
	1.4.2	Vaccination/immunisation ✓		
	1.4.3	Pheromones ✓		
	1.4.4	Leydig ✓		
	1.4.5	Cloning ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 The alimentary canal of a farm animal

2.1.1 Identification of parts

- **D** – Omasum ✓
- **F** – Rectum ✓ (2)

2.1.2 Classification of the alimentary canal of the farm animal

Ruminant ✓ (1)

2.1.3 Justification

- Has complex/compound stomach ✓
- Has rumen/reticulum/omasum/abomasum ✓ (Any 1 x 1) (1)

2.1.4 Identification of letters:

(a) F ✓ (1)
(b) A ✓ (1)
(c) G ✓ (1)

2.1.5 Part of the fowl performing same function as abomasum

Pro-ventriculus ✓ (1)

2.2 Vitamin or mineral deficiencies

2.2.1 **Osteomalacia** – Vitamin D/phosphorus/calcium ✓ (1)

2.2.2 **Night blindness –** Vitamin A/retinol ✓ (1)

2.2.3 **Goitre –** Iodine ✓ (1)

2.2.4 **Anaemia –** Iron/copper/vitamin B6 ✓ (1)

2.3 Calculation of digestibility coefficient of hay

2.3.1

- DM of hay = $\frac{85}{100}$ x 19 kg = 16,15 kg ✓
- DC = $\frac{\text{DM feed intake (kg) – DM manure (kg)}}{\text{DM feed intake (kg)}}$ x 100 ✓
- DC = $\frac{16,15 \text{ kg} - 2,5 \text{ kg}}{16,15 \text{ kg}}$ x 100 ✓
- DC = 84,5 ✓ % ✓ (5)

2.3.2 **TWO methods to improve digestibility of hay**

- Cutting/grinding ✓
- Pelleting ✓
- Crushing ✓
- Soaking/adding molasses ✓
- Supplementing with NPN ✓ (Any 2 x 1) (2)

2.4 Ratio formulation for farm animals

2.4.1 **Calculation of nutritive ration of FEED A**

NR = 1 : $\frac{\text{TDN (\%)} - \text{DP (\%)}}{\text{DP (\%)}}$ ✓

NR = 1 : $\frac{90\% - 10\%}{10\%}$ ✓

NR = 1 : 8 ✓ (3)

2.4.2 **The feed most suitable for growing lambs**

FEED B ✓ (1)

2.4.3 **Justification**

- Has more proteins / FEED B has 20% of DP and FEED A has 10% DP ✓
- Narrow NR ✓
- The NR is less than 1 : 6 ✓ (Any 1 x 1) (1)

2.5 Energy value of feeds

2.5.1 **TWO important aspects of Net Energy**

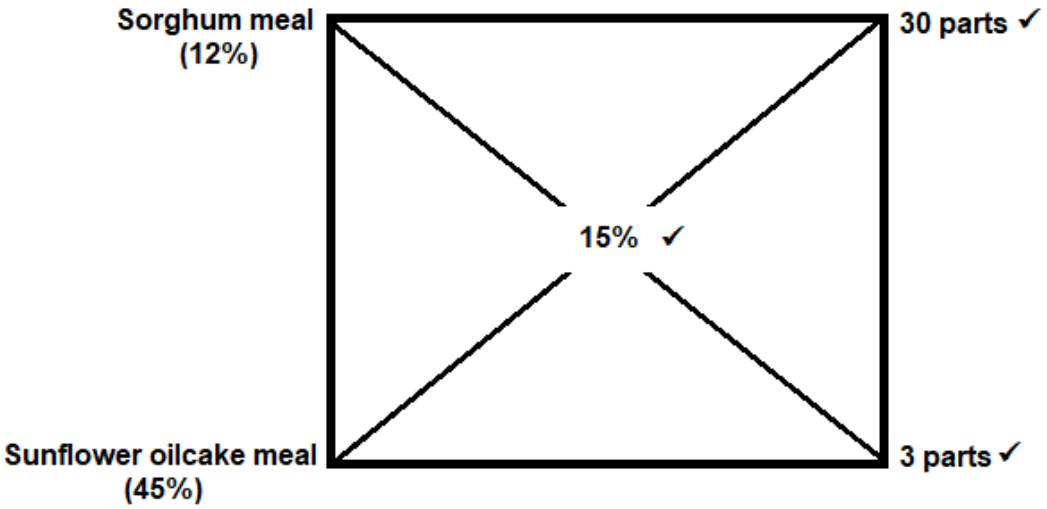
- Maintenance ✓
- Production/work/lactation/reproduction ✓ (2 x 1) (2)

2.5.2 **TWO purposes for calculating energy value of feed**

- Formulation of animal ration ✓
- Determine animal diet ✓
- Determine feeding standards for animals ✓ (Any 2 x 1) (2)

2.6 Formulation of the ration

2.6.1 Pearson's square method calculation



Ratio for sorghum meal to sunflower oilcake meal = 30 : 3 ✓ (4)

2.6.2 The percentage of sunflower oil cake meal in the mixture

- 30 + 3 = 33 ✓
- $\frac{3}{33}$ x 100 ✓
- 9,09% ✓ (3)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 The production systems

3.1.1 Identification of animal production systems

PICTURE A – Extensive ✓
PICTURE B – Intensive ✓ (2)

3.1.2 Justification:

PICTURE A (Extensive)
- Low stocking rate/low density/few animals in a large area ✓
- Less capital invested / no proper shelter / kraal made with stones ✓
- Animals fend for themselves ✓ (Any 1 x 1) (1)

PICTURE B (Intensive)
- High stocking rate/high density/many animals in a small area ✓
- More capital invested / proper cement shelter ✓
- Animals are fed by the farmer ✓ (Any 1 x 1) (1)

3.1.3 Differentiation

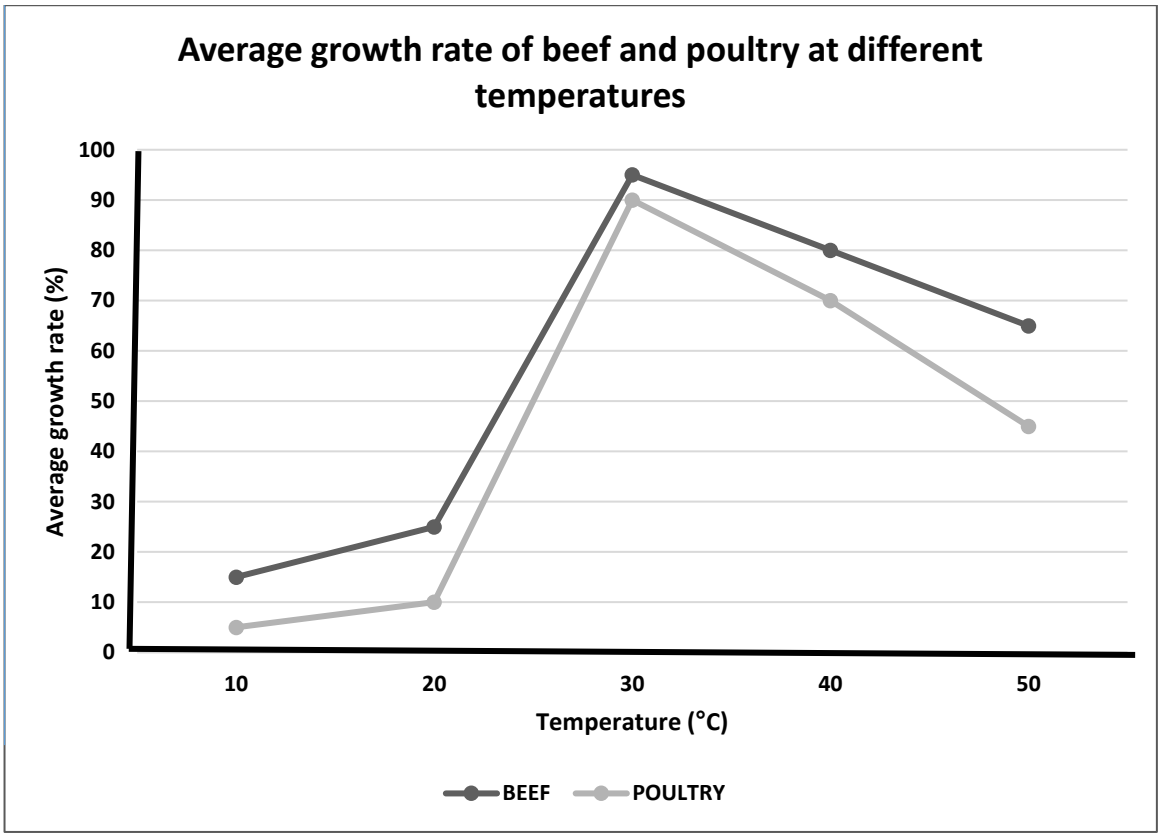
Subsistence farming system

- Farming on a very small scale in order to feed the family and sell the surplus ✓ (1)

Commercial farming system

- Farming on a large/medium scale to sell the produce and make a profit ✓ (1)

3.2 **Graph**



3.2.1 **Criteria for marking**

- Correct heading ✓
- Type of graph ✓
- X-axis – correctly calibrated with label (Temperature) ✓
- Y-axis – correctly calibrated with label (Average growth rate) ✓
- Correct units: Percentage and degrees (% and ˚C) ✓
- Accuracy (80% and more in plotting) ✓ (6 x 1) (6)

3.2.2 **The trend between beef and poultry at different temperature**

Poultry: Growth rate decreases at too low or too high temperatures ✓ (1)

Beef: Growth rate responds better at lower/higher temperatures than poultry ✓ (1)

3.2.3 **ONE method to protect poultry against extreme cold weather**

- Use of heaters ✓
- Air conditioners ✓
- Poultry house curtains ✓
- Insulation of roof and floor/bedding ✓ (Any 1 x 1) (1)

3.3 **The picture of a pig**

3.3.1 **Identification of the equipment**
Plywood board ✓ (1)

3.3.2 **TWO reasons for handling pigs**
- Vaccination ✓
- Dehorning ✓
- Dosing ✓
- Milking ✓
- Marking ✓
- Marketing ✓ (Any 2 x 1) (2)

3.4 **Animal diseases**

A – Ringworm ✓ (1)
B – Protozoa ✓ (1)
C – Mastitis ✓ (1)
D – Bacteria ✓ (1)
E – Virus ✓ (1)
F – Aggression / froth in the mouth / running and biting everything / circling / paralysis of lower jaw and tongue ✓ (1)

3.5 **Parasites**

3.5.1 **Classification of the parasite**
External parasite/exoparasites/ectoparasites ✓ (1)

3.5.2 **Reason**
Mites are found on less hairy parts of the skin ✓ (1)

3.5.3 **THREE examples of external parasites except mites and ticks**
- Nasal worms ✓
- Blue flies/blowflies ✓
- Lice ✓ (3 x 1) (3)

3.6 **Life cycle of parasites**

3.6.1 **The parasite**
Liver flukes/Trematodes/Flukes/Fasciola epatica ✓ (1)

3.6.2 **The intermediate host**
Snail/Slug ✓ (1)

3.6.3 **TWO pasture management measures of controlling internal parasite**

- Rotational grazing ✓
- Resting of infected pastures ✓
- Allowing animals that are resistant to specific internal parasites ✓
- Avoid wet places ✓
- Use of zero grazing ✓
- Removal of manure/hygienic measures ✓ (Any 2 x 1) (2)

3.7 **TWO examples of metallic salt poisoning**

- Salt poisoning ✓
- Urea poisoning ✓ (2)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 The reproductive system of a bull

4.1.1 Identification of parts

- **A** – Seminal vesicles ✓
- **C** – Urethra ✓
- **F** – Epididymis ✓ (3)

4.1.2 The process

Spermatogenesis ✓ (1)

4.1.3 Match of the functions

(a) E ✓ (1)

(b) L ✓ (1)

(c) J ✓ (1)

4.1.4 TWO congenital defects

- Hypoplasia ✓
- Cryptorchidism ✓
- Hermaphroditism ✓ (Any 2 x 1) (2)

4.1.5 Reason why scrotum is outside the body

To regulate the temperature ✓ (1)

4.2 Identification of the electronic or mechanical devises

(a) Tail-chalking/Tail-painting ✓ (1)

(b) Pedometer ✓ (1)

(c) Kamar heatmount detector/heatmount detector ✓ (1)

4.3 Oestrus cycle

4.3.1 The reproductive process

Oestrus cycle ✓ (1 x 1) (1)

4.3.2 Identification of phases of oestrus cycle

PHASE B – Pro oestrus ✓
PHASE C – Met oestrus ✓ (2 x 1) (2)

4.3.3 TWO hormones

- Oestrogen ✓
- Luteinising Hormone/LH ✓ (2 x 1) (2)

4.3.4 **TWO visible sexual behaviours displayed by bulls.**

- Resting the bull's chin on the cow's rump ✓
- Flehmen response/Bull extends its head and curl upper lip ✓
- Bull follows/excited about the cow on oestrus ✓
- Bulls smelling and licking external genitalia and urine of the cow ✓
- Pawing on the ground and snorting by the bull ✓
- Bellowing and tongue lapping ✓
- Bull will try to protect/guard the female on oestrus ✓ (Any 2 x 1) (2)

4.4 **Embryo transfer/transplant**

4.4.1 **Identification of the reproductive technique**

Embryo transfer/transplant ✓ (1)

4.4.2 **The stages of embryo transfer/transplant**

- C ✓
- A ✓
- D ✓
- E ✓
- B ✓ (5 x 1) (5)

4.4.3 **TWO methods of collecting semen**

- Artificial vagina ✓
- Electro-ejaculator ✓ (2)

4.5 **Stages of parturition**

4.5.1 **The stage of parturition**

Expulsion of foetus/ejection of foetus/delivery ✓ (1)

4.5.2 **Identification of the birth position**

Anterior ✓ (1)

4.5.3 **TWO signs of parturition**

- Vulva softens and become swollen ✓
- Cervix secretes sticky mucus ✓
- Cervix dilates ✓
- Cow urinates and defaecates frequently ✓
- Swollen udder that is dripping milk ✓
- Belly droops ✓
- Cow isolates itself ✓
- Cow stops eating ✓
- Cow shows signs of distress and discomfort ✓
- Cow becomes restless ✓ (Any 2 x 1) (2)

4.6 **The milk production cycle**

4.6.1 **The name of the graph**
Lactation curve ✓ (1)

4.6.2 **Identification of the range of weeks**
4 to 6 weeks ✓ (1)

4.6.3 **Name of the hormone**
Prolactin ✓ (1)
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TOTAL SECTION B: 105
GRAND TOTAL: 150